FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV. 11-2000)		ATTORNEY 'S DOCKET NUMBER		
TRANSMITTAL LETTE	BUG 2 0144			
DESIGNATED/ELECTED OFFICE (DO/EO/US)		U S APPLICATION NO (If known, see 37 CFR 1 5		
CONCERNING A FIL	ING UNDER 35 U.S.C. 371	09/937246		
INTERNATIONAL APPLICATION NO		PRIORITY DATE CLAIMED		
PCT/IB00/01767 23 NOVEMBER 2000		25 JANUARY 2000		
TITLE OF INVENTION THREE PIECE WHEEL FOR MOTOR VEHICLES				
APPLICANT(S) FOR DO/EO/US				
BERNONI, Claudio Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:				
1. X This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.				
2. This is a SECOND or SUBSEQU	JENT submission of items concerning a filing	under 35 U.S.C. 371.		
3. This is an express request to begin items (5), (6), (9) and (21) indica	n national examination procedures (35 U.S.C. 3	371(f)). The submission must include		
	expiration of 19 months from the priority date (A	Article 31).		
5. X - A copy of the International Appli				
	ired only if not communicated by the Internation	onal Bureau).		
<u> </u>	by the International Bureau.			
	oplication was filed in the United States Receiv			
	f the International Application as filed (35 U.S.	S.C. 371(c)(2)).		
a. is attached hereto. b. has been previously sul	omitted under 35 U.S.C. 154(d)(4).			
	International Aplication under PCT Article 19	(35 U.S.C. 371(c)(3))		
	uired only if not communicated by the Internat			
i =	ed by the International Bureau.			
c. have not been made; ho	wever, the time limit for making such amendm	nents has NOT expired.		
d. X have not been made and				
8. An English language translation of	of the amendments to the claims under PCT Art	ticle 19 (35 U.S.C. 371 (c)(3)).		
9. X An oath or declaration of the inve	entor(s) (35 U.S.C. 371(c)(4)).			
10. An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).				
Items 11 to 20 below concern document(s) or information included:				
11. An Information Disclosure Statement under 37 CFR 1.97 and 1.98.				
12. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.				
13. A FIRST preliminary amendment.				
14. A SECOND or SUBSEQUENT preliminary amendment.				
15. A substitute specification.				
16. A change of power of attorney and/or address letter.				
17. A computer-readable form of the	17. A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.			
18. A second copy of the published international application under 35 U.S.C. 154(d)(4).				
	19. A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).			
20. Other items or information:	International Search Re Notice Concerning Submi of Priority Document			

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^Շ ԹԳդ/ՒԳ«Շ	international application no PCT/IB00/01767			ATTORNEY'S DOCK		
21 X The follow	21. The following fees are submitted:				CALCULATIONS F	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):						_
Neither international preliminary examination fee (37 CFR 1.482)						
nor international search fee (37 ČFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO\$1000.00				1000.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO\$860.00				\$860.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO			\$710.00			
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00			\$690.00			
		n fee (37 CFR 1.482) paid				
and all claims satis	fied provisions of	PCT Article 33(1)-(4)		\$100.00	·	-
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Surcharge of \$130.0 months from the ear	0 for furnishing the liest claimed prior	ne oath or declaration late rity date (37 CFR 1.492(e	r than 20	30 \$;	
CLAIMS	NUMBER FIL	ED NUMBER EXT	TRA RAT	E \$	}	
Total claims	6 - 20	= ÷0-	x \$18.	00 \$		
Independent claims	1 -3		x \$80.			
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Applicant claim are reduced by	is small entity stat	rus. See 37 CFR 1.27. Th	ne fees indicated ab	1 1	. <u>.</u>	1
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months from the ear	liest claimed prior	ng the English translation rity date (37 CFR 1.492(f))).	□ 30 §		
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +			erty +	40.00		
		TOTAL FE	ES ENCLOSE	D = \$	540.00	
				A	Amount to be refunded:	\$
					charged:	\$
a. X A check in the amount of \$500.00 to cover the above fees is enclosed. X A check in the amount of \$40.00 is enclosed. b. Please charge my Deposit Account No in the amount of \$ to cover the above fees. A duplicate copy of this sheet is enclosed.						
c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 060308. A duplicate copy of this sheet is enclosed.						
d. Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.						
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status. SEND ALL CORRESPONDENCE TO Richard J. Minnich Fay, Sharpe, Fagan, Minnich & McKee, LLP 1100 Superior Avenue, 7th Floor Cleveland, OH 44114-2518 24,175						
				KEGISTKAT	ION NUMBER	

JC09 Recd PCT/PTO 2 1 SEP 2001 09/937246

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant

Claudio Bernoni

Serial No.

: Unknown

Filed

: Herewith

Title

THREE PIECE WHEEL FOR MOTOR

VEHICLES

Attorney Docket

BUG 2 0144

Assistant Commissioner For Patents

Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

Prior to substantive examination of the above-identified patent application, please amend the application as follows:

IN THE CLAIMS:

Please amend claims 3 and 4 as follows:

- 3. A wheel as claimed in claim 1, characterised in that the connecting means are coach screws in the inner rim.
- 4. A wheel as claimed in claim 1, characterised in that the connecting means are stud bolts screwed in the inner rim and comprise fastening nuts acting on the disc.

"Express Mail" Mailing Label Number 2000 Date of Deposit 5000 2000 Deposit 1 hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 GFR 1.10 on the date indicated above and is addressed to the Commissioner of Patonts and Trademarks, Washington, DC 20231.

Please add new claims 5-6 as follows:

- 5. A wheel as claimed in claim 2, characterised in that the connecting means are coach screws in the inner rim.
- 6. A wheel as claimed in claim 2, characterised in that the connecting means are stud bolts screwed in the inner rim and comprise fastening nuts acting on the disc.

REMARKS

It is respectfully submitted that the subject application is now in better condition for examination.

Respectfully submitted,

Richard J. Minnich Reg. No. 24,175

FAY, SHARPE, FAGAN, MINNICH & McKEE, LLP 1100 Superior Avenue Seventh Floor Cleveland, Ohio 44114-2518 (216) 861-5582

VERSION WITH MARKINGS SHOWING CHANGES MADE

- 3. A wheel as claimed in claim 1 [or 2], characterised in that the connecting means are coach screws[(5)] in the inner rim.
- 4. A wheel as claimed in claim 1 [or 2], characterised in that the connecting means are stud bolts[(18)] screwed in the inner rim and comprise fastening nuts[(19)] acting on the disc[(4)].

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Description

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Three Piece Wheel for Motor Vehicles

Technical Field

The present invention relates to a motor vehicle wheel in three parts joined by screws.

This type of wheel comprises three parts obtained separately: an inner rim, an outer rim, and a disc joined by welding or with screws.

Fastening with screws is preferable in case of maintenance on one of the rims, inner or outer, and to have greater manufacturing flexibility when defining groove width.

In other words, grooves of different widths can be produced more easily.

Generally, the disc is superposed on the outer rim for reasons of size, rigidity and aesthetics.

Background Art

US Patent 4 466 670 discloses a motor vehicle wheel of the type described above. Screws with nuts are used for fastening the parts. The screws must be positioned in such a way as to be reachable from the inner and outer side of the wheel and therefore are located at a certain radial distance from the tyre insertion groove. The outer rim can present a "C" shaped protuberance towards the inner rim which is superposed thereon to favour the required seal for tubeless tyres. US Patent 5 435 629 describes a three piece light alloy wheel, of the "sandwich" type. In this wheel, the disc is partially inserted between the two parts of the rim so that all parts must have accurate dimensional precision. The parts of the wheel, which are obtained by casting, are connected by screws with nuts and hence the screws are located at a certain radial distance from the tyre insertion groove.

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Disclosure of Invention

The aim of the present invention is to provide an improved three piece motor vehicle wheel which is an ideal compromise between lightness, strength and manufacturing cost and which has good aesthetics.

A further aim of the present invention is to provide a three piece motor vehicle wheel of simple and economical construction.

In accordance with an aspect of the present invention, a three piece motor vehicle wheel is presented as specified in claim 1.

The dependent claims refer to preferred and advantageous embodiments of the invention.

Description of the Drawings

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Embodiments of the invention are provided purely by way of non limiting example hereafter, with the aid of the accompanying drawings, in which:

- Figure 1 shows a partial cross section of the wheel according to the present invention; and
- Figure 2 shows a partial cross section of the wheel according to a variation of the present invention.

Description of the Illustrative Embodiments

In the description that follows, the term "outer" indicates the part of the wheel that is located externally to the motor vehicle when it is mounted thereon, and similarly the term "inner" indicates the part of the wheel that is located internally to the motor vehicle.

In accordance with the figure, the wheel according to the present invention is globally indicated as 1, and comprises an outer rim 2, an inner rim 3, a disc 4, and connecting screws 5.

The disc 4 is superposed to the outer rim 2 and both present a series of through holes 6 and 7, respectively in the disc 4 and in the outer rim 2, within which pass the screws 5. The inner rim 3 presents a groove 9 with a wall 10. In the thickness of the wall 10 is found a series of threaded blind holes 11 for the passage of the screws 5. The through holes 6, the through

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holes 7 and the blind holes 11 are uniformly distributed along the periphery of the disc 4 and of the respective elements and are positioned in mutual correspondence, in such a way as to be traversed by the screws 5. Said screws 5 present an axis 8 which is parallel and proximate to or coinciding with the neutral axis 12 of the wall 10. In this way the screws 5 increase the overall rigidity of the wheel 1.

Since these wheels are provided for use with tubeless tyres, for air tightness the outer rim 2 has a first annular surface 14 which is in contact with a corresponding second annular surface 15 of the inner rim 3. The specific position of the screws 5 is favourable for air tightness in the area 13 where the outer rim 2 connects with the inner rim 3.

Preferably, the outer rim 2 is made of light alloy plate, for instance Anticorodal (UNI 9006/4). The inner rim 3 and the disc 4 instead are obtained by casting, for instance with G-AlSi7 UNI EN 1706 or ASTM A356.0. The inner rim can also be obtained by casting with subsequent drawing, or by the "flow-forming" process, or by casting with thixotropic alloys. The disc 4 can alternatively be obtained by forging, or pressing, or also be made with composite materials such as fibre-reinforced resins.

It should therefore be noted that the first annular surface 14 of the outer rim 2 is compressed between the second surface 15 of the inner rim and a third annular surface 16 of the disc 4.

Material selection and the aforesaid form of connection favour the air tightness of the tyre (not shown herein) in the connection area 13. The outer rim 2, which is preferably made of plate, is more ductile and flexible and is compressed between the disc 4 and the inner rim 3 which are obtained by casting (or by a process which allows to obtain a greater rigidity) and hence are more rigid. The position of the screws 5 inserted in the thickness of the wall 10 of the inner circle 3 further increases the rigidity of the wheel 1. Moreover, the axis 8 of the screws 5, parallel and proximate or coinciding with the neutral axis 12 of the wall 10 increases its flexural strength, so that the wall 10 moves less as a result of stresses, and the possibility of leaks in the connection area 13 is reduced.

To enhance air tightness between the outer rim 2 and the inner rim 3, a seal 17 can be provided with silicone-based material or by welding.

The outer rim 2 made of plate presents numerous advantages: it has higher mechanical characteristics than cast rims and can better withstand

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impacts, which are more frequent in the outer part. The outer rim 2 can be obtained with lesser thickness than cast rims and is thus lighter, so that a better strength/resistance ratio is obtained compared to cast rims. Plate allows to obtain excellent surface finishes with no need for further treatments which are in fact necessary for cast parts, thereby diminishing the risk of wastage.

The outer rim 2 made of plate further allows to position the screws 5 on larger diameters compared to wheels with cast rims, and to have the disc 4, which allows to improve resistance against relative sliding, or in other words torsional strength, between the disc 4, the outer rim 2 and the inner rim 3.

The inner rim 3 obtained by casting has no need for particular aesthetic treatments because it is in a non visible area. The screws 5, being screwed directly into the thickness of the wall 10, require no nut for their fastening. Mounting of the pieces is facilitated and it is not necessary to provide space for the nuts on the inner side of the rim.

The construction of a wheel according to the invention is therefore more economical, overall, than prior art wheels.

According to an alternative embodiment shown in Figure 2 the screws 5 are replaced by stud bolts 18, already screwed in the inner rim 3, with related nuts 19 for fastening the parts. With this embodiment, the thread of the blind hole 11 is not worn out in case of frequent disassembly.

Different fastening means can also be used: instead of the screws 5 or of the stud bolts 18, for instance, one can use pins inserted by forcing.

The outer rim made of light alloy plate is particularly advantageous to obtain an aesthetically pleasing appearance. Plate allows to obtain lesser surface roughness and greater lustre directly from the production process without requiring additional machining.

The invention thus conceived can be subject to numerous modifications and variations, without thereby departing from the scope of the inventive concept. Moreover, all components can be replaced by technically equivalent elements.

	Key	
	1	wheel
	2	outer rim
	3	inner rim
5	4	disc
	5	screws
	6	first holes of the disc 4
	7	second holes of the outer rim 2
	8	axis of screws 5 of stud bolts 18
10	9	groove
	10	wall
	11	threaded blind holes in inner rim 3
	12	neutral axis of wall 10
	13	connection area
15	14	first annular surface
	15	second annular surface
	16	third annular surface
	17	seal or weld
	18	stud bolts
20	19	nuts for stud bolts 18

PCT/IB00/01767

Claims

1. A three piece wheel (1) for motor vehicles, comprising an outer rim (2) provided with second holes (6) in proximity with its own periphery, an inner rim (3) provided with a groove (9) with a wall (10), the outer (2) and inner (3) rims forming a support for a tyre; a disc (4) provided with at least first holes (6) in proximity with its periphery, the disc (4) being partially superposed onto the outer rim (2); means (5; 18, 9) for connecting the disc (4), the outer rim (2) and the inner rim (3), the connecting means (5; 18, 19) being provided with an axis (8) and passing through the first (6) and the second holes (7) of the disc (4) and of the outer rim (2); the wheel (1) being characterised in that the connecting means (5; 18, 19) are inserted in the thickness of the wall (10) of the groove (9) of the inner rim (3) without projecting therefrom and in that the axis (8) of the connecting means (5; 18, 19) is in proximity to or coincident with the neutral axis (12) of said wall (10) of the groove (9) of the inner rim (3).

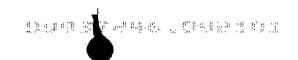
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- 2. A wheel as claimed in claim 1, characterised in that the disc (4), the inner rim (3) are obtained by casting and in that the outer rim (2) is made of stamped plate.
- 3. A wheel as claimed in claim 1 or 2, characterised in that the connecting means are coach screws (5) in the inner rim.
 - 4. A wheel as claimed in claim 1 or 2, characterised in that the connecting means are stud bolts (18) screwed in the inner rim and comprise fastening nuts (19) acting on the disc (4).





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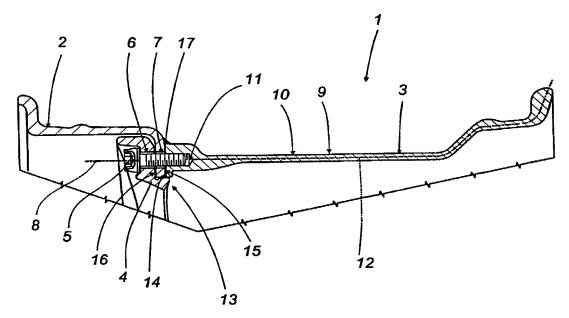
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(72) Inventor; and

(75) Inventor/Applicant (for US only): BERNONI, Claudio

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette

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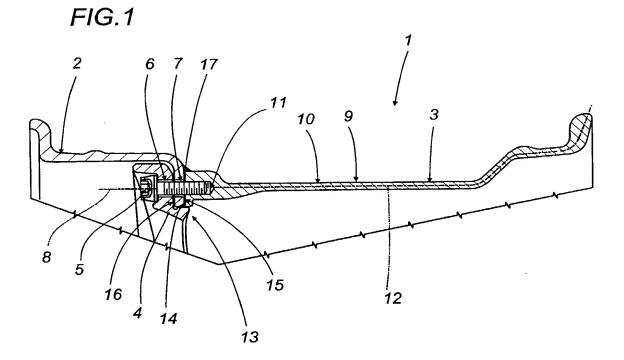


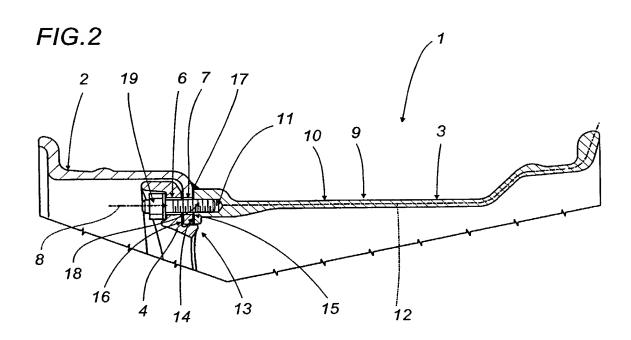
(57) Abstract: The invention relates to a wheel (1) made of three parts: an outer rim (2), an inner rim (3), a disc (4) joined by means of coach screws of stud bolts (18) directly screwed into the thickness of the wall (10) of the inner rim (3), the outer rim (2) can be made of stamped light alloy plate, whilst the other parts can be otained by casting: advantages are achieved in terms of lightness, economy and aesthetics.

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DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

_	Three	piece	wheel	for	motor	vehicles.
_						
_						

the specification of which:

- ☐ is attached hereto.
- was filed on November 28, 2000
 as-U-S. Serial No. PCT/IB00/01767
 PCT

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign priority benefits under Title 35,
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or inventor's certificate listed below and have also identified
below any foreign application for patent or inventor's

25/01/2000

certificate having a filing date before that of the application on which priority is claimed:

B02000A 000025	ITALY	25/01/2000
(Number)	(Country)	(Day/Month/Year Filed)
(Number)	(Country)	(Day/Month/Year Filed)
(Number)	(Country)	(Day/Month/Year Filed)
I hereby c	laim the benefit u	nder Title 35, United States
Code, §119(e) o	f any United State	s provisional application(s)
listed below:		
(Application Num	mber)	(Filing Date)
(Application Nu	mber)	(Filing Date)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Serial No.)	(Filing Date)	(Status)
(Serial No.)	(Filing Date)	(Status)
(Serial No.)	(Filing Date)	(Status)

I hereby appoint the following attorneys to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith:

Thomas E. Beall, Jr., Reg. No. 22,410—Daniel G. Blackhurst, Reg. No. 24,039—Joseph D. Dreher, Reg. No. 37,123—Christopher B. Fagan, Reg. No. 22,987—Jude A. Fry, Reg. No. 38,340—Jeffrey M. Ketchum, Reg. No. 31,174—Richard M. Klein, Reg. No. 33,000—Thomas E. Kocovsky, Jr., Reg. No. 28,383—Sandra M. Koenig, Reg. No. 33,722—Petar Kraguljac, Reg. No. 38,520—Scott A. McCollister, Reg. No. 33,961

James W. McKee, Reg. No. 26,482
John R. Mattingly, Reg. No. 30,293
Richard J. Minnich, Reg. No. 24,175
Jay F. Moldovanyi, Reg. No. 29,678
Philip J. Moy, Reg. No. 31,280
Timothy E. Nauman, Reg. No. 32,283
Sue Ellen Phillips, Reg. No. 32,046
Patrick R. Roche, Reg. No. 29,580
Albert P. Sharpe, III, Reg. No. 19,879
Mark S. Svat, Reg. No. 34,261
John C. Tiernan, Reg. No. 21,078

22

Address all telephone calls to: Richard J. Minnich At Telephone Number: (216) 861-5582

Address all correspondence to:

FAY, SHARPE, BEALL,
FAGAN, MINNICH & MCKEE

1100 Superior Avenue
Suite 700
Cleveland, Ohio 44114-2518

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or

imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Claudio BERNONI	
Full/Wame of First Inventor	Full Name of Second Inventor
ly en m	
Inventor's \$ignature	Inventor's Signature
September 10, 2001	
Date	Date
SELVAZZANO DENTRO - ITALY I/X	445444
Residence	Residence
ITALIAN	
Citizenship	Citizenship
Via San Domenico, 9	
Post Office Address	Post Office Address
35030 SELVAZZANO DENTRO - ITALY	
Full Name of Third Inventor	Full Name of Fourth Inventor
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